

REMARKS

In the Office Action¹, the Examiner rejected claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by Lee et al. (U.S. Patent No. 5,807,758, hereafter "Lee"), rejected claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by Thundat (U.S. Patent No. 6,016,686, hereafter "Thundat"), and rejected claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by Quate et al. (U.S. Patent No. 6,203,981, hereafter "Quate"). Further, the Examiner indicated that JP 2000-60554, JP 2002-250726, and JP 2003-526331 listed in the Information Disclosure Statement filed April 1, 2005 had not been considered.

By this Amendment, Applicants amend claim 1. Support for the claim amendments can be found in the specification at, for example, paragraphs [0044] to [0048] of this published application. Claims 1-18 remain pending with claims 5-18 withdrawn from consideration.

Applicants respectfully traverse the rejection of claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by Lee.

Claim 1, as amended, recites an interaction detecting method for detecting an interaction between a detecting material and a target material in a detecting part, the detecting part including a reaction area for performing the interaction and a cantilever having a surface treated to fix the detecting material thereto, the method comprising, for example, "forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever," (emphasis added).

Lee, at column 6, lines 46-56, discloses,

Thus, as shown in FIG. 4, in this preferred embodiment of the invention 40, when a charged or dipolar target species 46 (shown here as a DNA strand) is bound to a cantilever 12 through a linkage 13, in an electric field, the electric force acting on this species (shown by arrow 29) will cause the cantilever 12 to move relative to its base 14, as indicated by arrow 7. However, when no species is bound to the cantilever, then there will be no force causing the cantilever to move. Moreover, the force on the cantilever 12, and hence its deflection, will scale roughly linearly with the number of species 46 bound to the cantilever 12.

(Emphasis added). Accordingly, Lee merely teaches moving cantilever 12 relative to base 14 by acting an electric field on charged target species 46 bounded to cantilever 12, which cannot constitute a teaching of “forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever,” as recited in amended claim 1.

Claim 1 thus distinguishes over Lee. Claim 2 depends from claim 1 and distinguishes over Lee at least due to its dependence.

Applicants respectfully traverse the Examiner’s rejection of claims 1 and 2 under 35 U.S.C. § 102(b) as being anticipated by Thundat.

Thundat, at column 6, line 65, to column 7, line 20, discloses,

A second embodiment of the present invention the spring element 103 is attached to a base 102, the spring element 103 having two coating layers (FIG. 2), one layer 107 sensitive to hydrogen ions, and a second layer 108 having biomaterials in a polymer base. The biomaterial layer and/or the layer sensitive to hydrogen ions will develop a surface charge density different than the base material 104 of the cantilever 103. The second surface 105, which may be of an inert material different than the base material 104, such as ceramics, polymers, or silica. One of the layers 107 or 108 may contain enzymes, peptides, proteins, nucleic acids,

¹ The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicants decline to automatically subscribe to any statement or characterization in the Office Action.

carbohydrates, antibody and antigen molecules, pharmacological agents (i.e. drugs, including small organic molecules such as aspirin), and other biopolymers that interact and bind with enzymes in the sample 113 to produce pH changes on the spring element surface in proportion to pH changes in the sample 113 placed on the sensing layer. Therefore the spring element 103 may be utilized for enzyme-linked immunoassays. With selection of the appropriate biopolymer, and calibration of surface charge density and associated mechanical stress buildup, the number of enzymes within a sample 113 may be calculated with the microcantilevered spring element 103.

(Emphasis added). Accordingly, Thundat merely teaches developing a surface charge density on layer 107 or layer 108 of cantilever 103, which cannot constitute a teaching of “forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever,” as recited in amended claim 1.

Claim 1 thus distinguishes over Thundat. Claim 2 depends from claim 1 and distinguishes over Thundat at least due to its dependence.

Applicants respectfully traverse the Examiner’s rejection of claims 1-4 under 35 U.S.C. § 102(b) as being anticipated by Quate.

Quate, at column 5, lines 13-25, discloses,

Turning to the specific example of using the present method to detect DNA hybridization, as shown in FIG. 1, the surface of a cantilever 110 is first prepared in order to be able to attach single strands of DNA. Such surface preparations are known to those of skill in the art of DNA hybridization detection methods. More specifically, cantilevers made of a solid substrate, for example silicon or similar materials, are prepared with special surfaces of silicon dioxide (SiO₂) and standard procedures are used for making a functionalized layer that allows attachment of probe molecules. Next, a binding partner or probes molecules, for example, single stranded DNA 120, are introduced onto one surface of the cantilever.

(Emphasis added). Accordingly, Quate merely teaches preparing cantilever 110 using a semiconductor material, e.g., silicon, with special surfaces made of silicon

oxide, which cannot constitute a teaching of "forming, in the reaction area, an uneven electric field concentrated at the treated surface of the cantilever," as recited in amended claim 1.

Claim 1 thus distinguishes over Quate. Claims 2-4 depends from claim 1 and distinguishes over Quate at least due to their dependence.

In view of the foregoing remarks, Applicants respectfully request reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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